A CSIRO researcher samples a stream for EDCs in the Adelaide hills. CSIRO

Targeting endocrine disruptors in Australia's waterways

Australia has lagged behind Europe and North America in research and policy on endocrine disrupting chemicals in the country's waterways. CSIRO has been working with Land & Water Australia to lay the groundwork for local action.

Rachel Carson's documentation of the devastating effects of pesticides on the natural world in her landmark book *Silent Spring*[1] in 1962 eventually led to the ban of DDT in the US.

In 2006 – coincidentally the centenary of Carson's birth – CSIRO and Land & Water Australia released a groundbreaking report on the impact of endocrine disrupting chemicals (EDCs) in Australia's waterways.[2]

The report, the first of its kind for the Australasian region, not only lays the foundation for a local research effort, but could well alter future government policy on water management.

Earlier research overseas – mainly carried out by research bodies in Europe and North America – has shown that populations of aquatic wildlife exposed to EDCs exhibit skewed sex ratios, abnormal gonad development and reproductive failure. This is because EDCs mimic, block or disrupt the actions of hormones, and disrupt the normal functioning of the endocrine system.

EDCs are known to cause harm at very low levels of exposure so, with trace levels having been found in common household products such as milk and shampoo and in water catchments from Las Vegas to Japan, these chemicals have emerged in recent years as a contaminant of international concern.

Australian research on the issue has been scarce, despite EDCs being identified in discharges from intensive livestock operations, wastewater treatment plants and paper mills, and in runoff from pesticide- or manure-laden farmlands.

Given Australia's low stream flows and declining freshwater resources due to persistent drought, CSIRO Land and Water together with Land & Water Australia embarked upon a three-year research project in 2004 to better understand the potential risks of EDCs in our waterways and provide for future risk assessment.

The CSIRO team, led by Dr Rai Kookana, set out to assess EDC levels at targeted sites across Australia, determining factors that could influence the rate of EDC degradation, and tailoring a research methodology appropriate for Australian ecosystems.

The study shows that streams across Australia carry EDCs at concentrations that stimulate significant changes to the sexual cycles of native fauna, especially in catchment areas surrounding cattle feedlots, dairies and piggeries. EDCs tend to be at higher concentrations in sediments under anaerobic conditions, which has implications in the reuse of water and biosolids. The researchers found that spreading wastewater on aerobic and biologically active soils can rapidly break down EDCs.

The technical report was launched last year in Canberra at the Second Australian Symposium on Ecological Risk Assessment and Management of EDCs, Pharmaceuticals and Personal Care Products in the Australasian Environment.

At the symposium, internationally renowned environmental scientist Dr Susan Jobling commented that levels of aquatic EDCs recorded in the report meant that species living in the waterways studied would already be affected. Dr Jobling said she would support legislation that would bring Australian Government policy into line with Europe and the US.

Both Dr Kookana and Dr Jobling were joined at a post-symposium workshop by 22 Australian and international researchers, policy makers, regulators, water suppliers and research investors. Facilitated by Land & Water Australia's Dr Stuart Pearson, the group drafted 'The 2007 Black Mountain Declaration on Endocrine Disrupting Chemicals in Australian Waters' – the first national position paper on the issue, which outlines priority areas for future research, policy attention and public awareness.

● **Tuppy McIntosh**

More information:
A free copy of 'Endocrine Disrupting Chemicals in the Australian Riverine Environment' or the Black Mountain Declaration can be found at www.lwa.gov.au.

1 Carson R (1962). *Silent Spring*. Houghton Mifflin, Boston.
2 Williams M *et al.* (2007). Endocrine Disrupting Chemicals in the Australian Riverine Environment. Land & Water Australia Technical Report, November. Download at www.lwa.gov.au/.